

summer crops of potatoes, peas, &c., can be profitably grown.

Mr. T. R. Sim discussed the distribution of South African ferns, and pointed out that the recent opening up of the Orange River Colony, the Transvaal, and Rhodesia has resulted in the filling up of many gaps in our knowledge of this subject.

Dr. Schönland gave a survey of our knowledge of South African succulent plants, chiefly from the historical and systematic points of view.

A paper was also contributed by Mr. J. Medley Wood on the indigenous plants of Natal.

Technical Papers.—Among these may be mentioned an interesting note by Dr. Horace T. Brown, F.R.S., on the dissipation of absorbed solar radiation by xerophilous plants. He pointed out that in ordinary foliage leaves the amount of heat necessary to vaporise the water of transpiration is so considerable that such a leaf may be subjected to intense solar radiation without acquiring a temperature of more than a very few degrees above that of the surrounding air. In xerophilous plants, however, transpiration is at a minimum, and therefore some other method of guarding against the risk of dangerously high temperatures is necessary. According to the author, this is to be found in the loss of heat due to thermal emission. Experiments have been conducted by him (in collaboration with Dr. W. E. Wilson) which show that a powerful cooling effect is produced by the high thermal emissivity of a leaf surface, even when transpiration is completely in abeyance.

Prof. H. H. W. Pearson communicated an interesting account of his investigations into the development and germination of the spores of *Welwitschia*. The results obtained show that some of the current views of the relationship of this extraordinary plant to the other genera of the Gnetaceæ must be considerably modified.

Prof. Douglas Campbell described the prothallium and reproductive organs of *Gleichenia pectinata*, and directed attention to the similarity that exists between them and those of *Osmunda*.

Prof. M. C. Potter presented two papers. In the first an account was given of some experiments which showed that amorphous carbon can be slowly decomposed by the agency of a soil bacterium, with the evolution of carbon dioxide.

The second dealt with the healing of parenchymatous tissues in plants. According to the author, the first step in this process (prior to the formation of cork) is the closing of the intercellular spaces by the formation of a "wound-gum" similar to that described by Temme in wounded xylem vessels. Thus the increased rate of gaseous interchange caused by the wound is very soon checked.

Mr. I. B. P. Evans, in a paper on infection phenomena in the Uredineæ, said that it is quite possible to identify different species of *Puccinia* by the shape of their infection vesicles.

Dr. G. Potts contributed a paper on the action of calcium compounds on *Plasmodiophora Brassicae* ("finger and toe"). Experiments show that an acid soil encourages the growth of the parasite, while alkaline substances inhibit it.

A most interesting feature of the Cape Town meeting was afforded by a fine collection of native plants, brought together with considerable trouble by Dr. Marloth. These included a number of the more striking succulents from the Karroo region, and also a great many plants from the south-west district of Cape Colony. The latter were, for the most part, in flower, the heaths and the Iridaceæ in particular presenting a beautiful blaze of colour. Dr. Marloth also exhibited a number of ecological photographs taken in various parts of Cape Colony.

But, apart from the meetings themselves, the over-sea botanists found considerable opportunities of observing the vegetation of the various districts passed through during the tour. It is true that much of the travelling was hurried, but even when passing rapidly through a new country a botanist is able to gather valuable impressions of the general facies, &c., of the vegetation.

At the Cape, though the season was still early spring, a considerable number of plants were in flower. Table Mountain and the slopes of the Lion's Head were explored

so far as time permitted, and many plants characteristic of the Cape Peninsula flora were observed. Some of the most striking of these were plants belonging to the families Ericaceæ, Proteaceæ, and Restiaceæ.

Several members of Section K visited the Karroo, and spent some days in examining the many curious xerophilous desert plants to be found there.

In the Transvaal and elsewhere little or no rain had fallen for some five months before the visit of the association, and in consequence the country presented a very parched and brown appearance, except where irrigation had resulted in vivid patches of green crops, or groves of Eucalyptus trees had been planted. The latter, as well as other Australian plants, have been extensively imported, and promise to become of considerable economic importance in South Africa.

A very striking feature of the bush vegetation in various parts of the Transvaal was the extraordinary prevalence of parasitic Lorantheæ, many of the acacia and other trees being loaded with the parasites.

At Pretoria the Government experimental grounds were visited, the visitors being received by Mr. Smith, the Director of Agriculture, and Mr. Burtt-Davy. Extensive experiments are being at present carried on here with a view to the introduction of new grasses to improve the pasturage of the Transvaal. Other useful introduced plants include several species of *Atriplex* (the Australian "salt-bush"). As these plants are markedly xerophilous, and at the same time good fodder plants, they will probably prove very useful in a climate such as that of the Transvaal.

The agricultural department in Pretoria had also arranged an exhibition illustrative of the vegetable products of the Transvaal.

Mr. Burtt-Davy arranged a special botanical excursion to the Magaliesberg, where the "Wonderboom," an exceedingly fine specimen of *Ficus cordata*, was visited.

Other areas of botanical interest passed through included the High Veld, the Bush Veld, the teak forest of Rhodesia, and the luxuriant so-called rain-forest immediately surrounding the Victoria Falls.

PRIZE SUBJECTS OF THE INDUSTRIAL SOCIETY OF MULHOUSE.

THE Industrial Society of Mulhouse has issued its programme of the prizes to be awarded by the society during the year 1906; excluding the subjects which are of a purely local or technical character, the following are the principal prizes open to competition to all nations.

In the section of chemistry medals of honour are offered for a memoir on the theory and manufacture of alizarin-red by the rapid process, for a synthesis of the colouring matter of cochineal, for a research on cochineal carmine, for an investigation of the colouring matter of cotton, of the transformation of cotton into oxycellulose, or of the composition of aniline blacks; also for a research on the chemical changes of wool under the action of hypochlorites or chlorine, for a synthesis of a natural dye, for a theory of the manner of formation in nature of any organic substance, or for a chemical study of the fat of Turkey-red. Several medals will also be awarded for special chemical studies of mordants and their action, for the production by artificial means of certain dyes, and for practical methods of fixing certain dyes to the fibre. A method of manufacturing carbon tetrachloride at a price such as will enable it to compete with carbon bisulphide and benzene is also required. A sum of 500 francs to 1000 francs will be allotted to the best compilation of the densities of inorganic and organic substances in the solid state and in cold saturated solution. Medals will be given for the production of substances capable of taking the place of certain named chemicals which have an industrial use, and for the solution of a number of specified problems in the bleaching, dyeing, and printing of textiles.

In the section of mechanical arts a prize of 500 francs with a silver medal is offered for a new method of construction of buildings suitable for cotton spinning, wool combing, or calico printing. The following subjects will receive medals:—a new type of steam boiler; an indicator of the total work done in a steam engine; new forms of

gas generators for gas engines; new types of gas engines; a new method of heating boilers; new methods of spinning, weaving, and dyeing textile fabrics; a simple cut-out for electrical installations.

The following subjects in natural history and agriculture will be awarded medals:—a geological or mineralogical description of part of Alsace; a detailed catalogue of plants in the neighbourhood of Mulhouse, Thann, Altkirch, and Guebwiller; a treatise on the fauna of Alsace; a treatise on the plants and insects inimical to agriculture in Alsace and the methods of destroying them.

In commerce and statistics the prize subjects are:—a study of methods of insurance against risks of transport; a treatise on insurance against fire, with especial reference to the factories of Alsace; a memoir on the variation in the price of coal in Alsace during the last thirty years; a study of the effect of taxation on industrial development.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The Vice-Chancellor has announced to the Senate the munificent gift of 1750*l.*, made by Dr. Ludwig Mond towards the fund for increasing the stipends of the Stokes and Cayley university lecturers in mathematics.

The detailed proposals put for the diploma in forestry were to be discussed on Thursday last. Apparently they satisfied the members of the university, for there was no criticism made on them.

The degree of Master of Arts, *honoris causa*, is to be conferred upon Mr. R. I. Lynch, curator of the botanic garden. Mr. Lynch is well known as a writer on horticultural subjects.

On the nomination of the board of geographical studies, Dr. Guillemard and Sir G. D. T. Goldie, K.C.M.G., F.R.S., and on the nomination of the council of the Royal Geographical Society, Sir Clements R. Markham, K.C.B., F.R.S., and Dr. J. Scott Keltie, have been appointed members of the board of geographical studies for the year beginning January 1, 1906.

Mr. J. B. Peace has been appointed chairman of the examiners for the mechanical sciences tripos, 1906.

The general board of studies has approved Mr. H. J. H. Fenton of Christ's College, for the degree of Doctor in Science.

The following notice of the next award of the Walsingham medal has been issued:—The medal is to be awarded for a monograph or essay giving evidence of original research on any botanical, geological, or zoological subject. The competition is open to graduates of the university who at the time fixed for sending in the essays are under the standing of Master of Arts. The essays for the ensuing year are to be sent to the chairman of the special board for biology and geology (Prof. Langley, The Museums) not later than October 10, 1906.

The special board for biology and geology give notice that the Gedge prize will be offered for competition in the Michaelmas term, 1906. The prize will be awarded for the best original observations in physiology, but a candidate who has received a certificate of research from the university will not be entitled to submit an essay which is substantially the same as the dissertation for which such certificate of research was granted. Candidates need not necessarily be graduates of the university. Essays are to be sent to the professor of physiology not later than October 1, 1906.

DR. A. J. EWART, special lecturer in vegetable physiology, Birmingham University, has been appointed professor of botany in the University of Melbourne in succession to the late Baron von Müller.

THE will of the late Mr. John Edward Taylor, part proprietor and a former editor of the *Manchester Guardian*, on which probate was granted in London on December 9, among numerous bequests, leaves, on the decease of the widow, 20,000*l.* to the Victoria University of Manchester.

At a meeting of the council of the University of Birmingham held on December 6, the Chancellor announced that the family of the late Mr. Harding had

offered 10,000*l.* to the Birmingham University for the erection of a library. The offer has been gratefully accepted by the council.

On Tuesday, December 5, Sir W. Martin Conway distributed the prizes and certificates gained by the students at the Sir John Cass Technical Institute during the past session. Sir Owen Roberts, chairman of the governing body, presided. Mr. George Baker stated that the scope of the work of the institute and the number of students continued to progress steadily, and that a large proportion were studying subjects bearing directly upon the industries in which they were engaged. Sir Martin Conway, in the course of his address, pointed out that people in this country suffer from a confusion of ideas in respect to education, and that they do not believe sufficiently in the necessity of giving the highest possible education to the directing brains of industries, nor do they understand sufficiently the length of time and the experience that are required for skilful hands to receive their full equipment. He remarked that the real struggle with Germany in manufactures is due to the enormous number of highly educated men turned out at the German universities; it is not a question of technical education, but of scientific education. The German is not a whit more scientific or better than the Briton, but faith in science which exists in Germany is lacking in England, and this gives the Teutonic tortoise the advantage over the British hare.

THE following bequests and gifts for higher education in the United States are announced in *Science*. By the will of the late Mr. Stephen Salisbury, the Worcester Polytechnic Institute receives a bequest of 40,000*l.* This money comes without restrictions of any kind on the part of the testator. In addition to this bequest, Mr. Salisbury, at the time of his resignation a few weeks ago from the presidency of the board of trustees, made an additional gift to the institute of 20,000*l.*, to be paid immediately. Formal announcement of the 50,000*l.* legacy to the Sheffield Scientific School from the estate of the late Mr. M. D. Viets has been made by Prof. Russell H. Chittenden, director of the school. The bequest will be used for the physical, mathematical, and general scientific needs of the school. The late Mr. Frank Harvey Cilley, the engineer, has bequeathed the residue of his estate, which will probably amount to 14,000*l.*, to the Massachusetts Institute of Technology. Mr. T. P. Shonts, chairman of the Isthmian Canal Commission, has given to Monmouth College 2000*l.* as part of the 6000*l.* needed to obtain an additional 6000*l.* which Mr. Andrew Carnegie had promised to give the college for a library. The late Mr. Stephen Salisbury, of Worcester, Mass., has bequeathed 40,000*l.* to the Worcester Polytechnic Institute, 50,000*l.* to the American Antiquarian Society, and 1000*l.* and a site for a building for the Worcester Natural History Society.

PROF. W. J. ASHLEY, dean of the faculty of commerce in the University of Birmingham, distributed on December 6 the prizes gained by candidates at the examinations of the London Chamber of Commerce. During the course of a subsequent address, Prof. Ashley remarked that the science of commerce has yet to be made, but, in his opinion, a true science of commerce is capable of being created. At present, however, it does not exist. Its formulation should have been the task of the political economists; but hitherto English economists have been too content to pursue the results, the conclusions to be reached by a process of reasoning starting with certain assumptions. It is necessary that the problems which actually present themselves to a business man in the course of his operations should be realised and studied, and that the various ways in which they have been approached and faced ought to be brought together, grouped, criticised, and analysed. The function of the economist is not to arrive at general abstract conclusions and then look round in the world of business for examples or illustrations of the conclusions arrived at. He should condescend to a more concrete and a more patient survey of the actual facts of real life. Prof. Ashley considers it to be vitally important that the highest type of education shall be brought into close touch with the realities of economic life. If that is properly done it will not degrade education, but vivify it.